Fig. 1

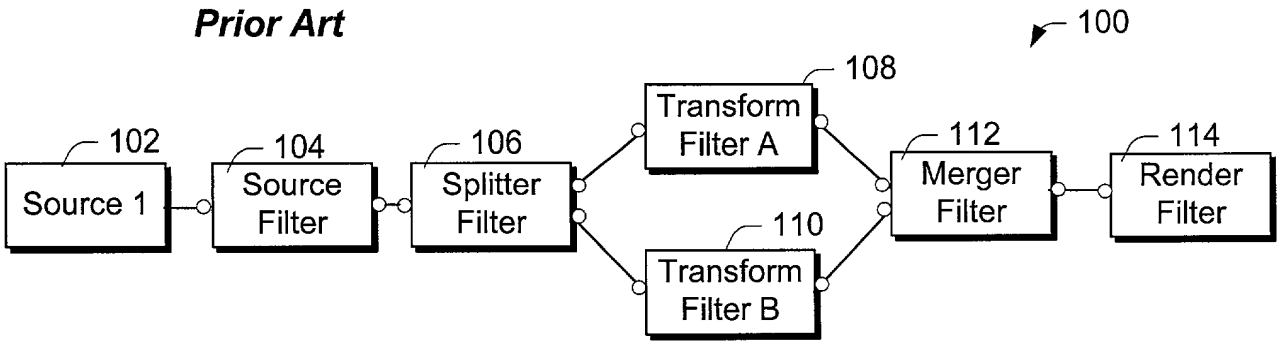
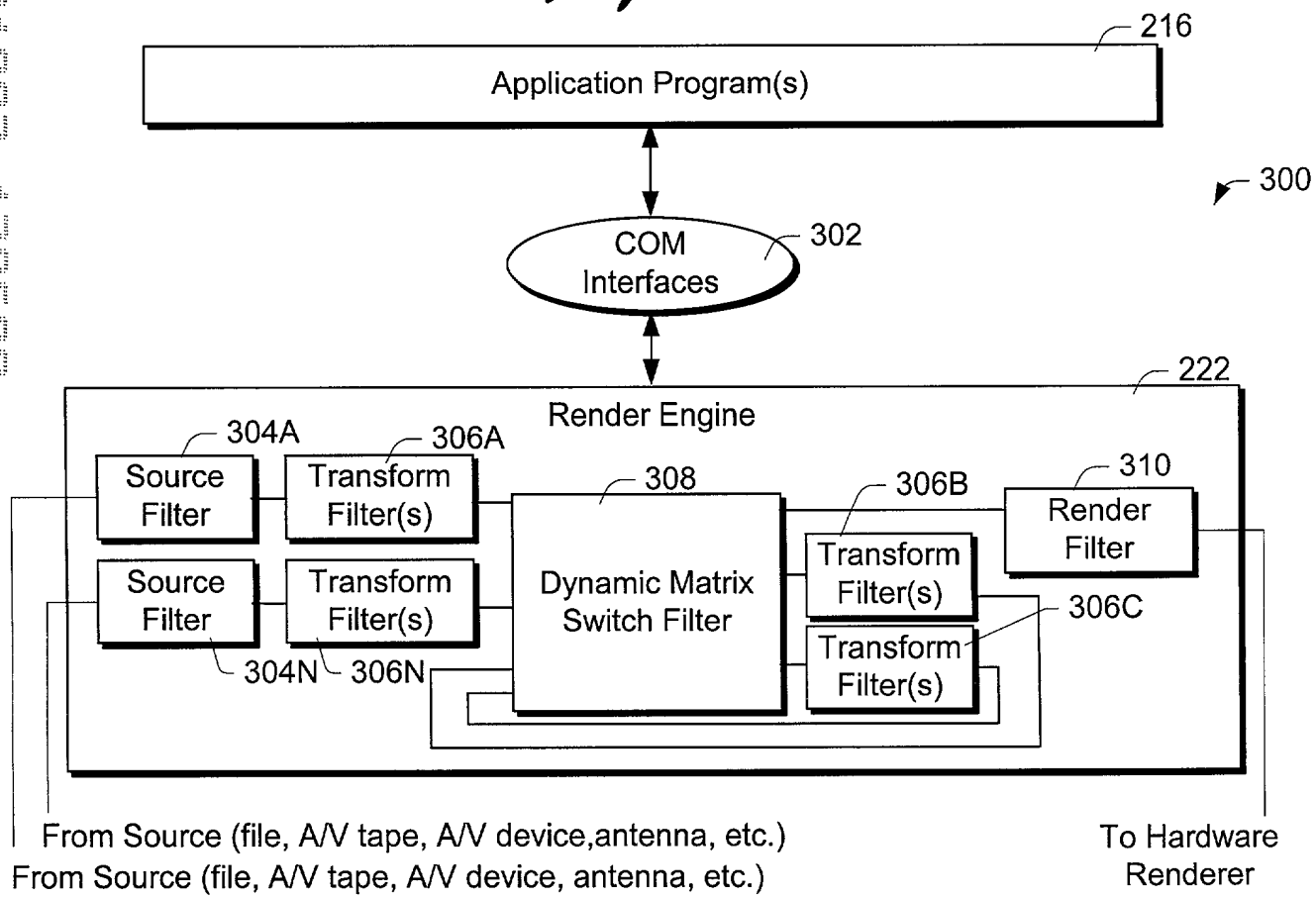

Prior Art
100
102
Source 1
104
Source Filter
106
Splitter Filter
108
Transform Filter A
110
Transform Filter B
112
Merger Filter
114
Render Filter

Fig. 3


216
Application Program(s)
300
COM Interfaces
302
222
Render Engine
304A
Source Filter
306A
Transform Filter(s)
Source Filter
Transform Filter(s)
304N
306N
308
Dynamic Matrix Switch Filter
306B
Transform Filter(s)
Transform Filter(s)
306C
310
Render Filter
From Source (file, A/V tape, A/V device,antenna, etc.)
From Source (file, A/V tape, A/V device, antenna, etc.)
To Hardware Renderer

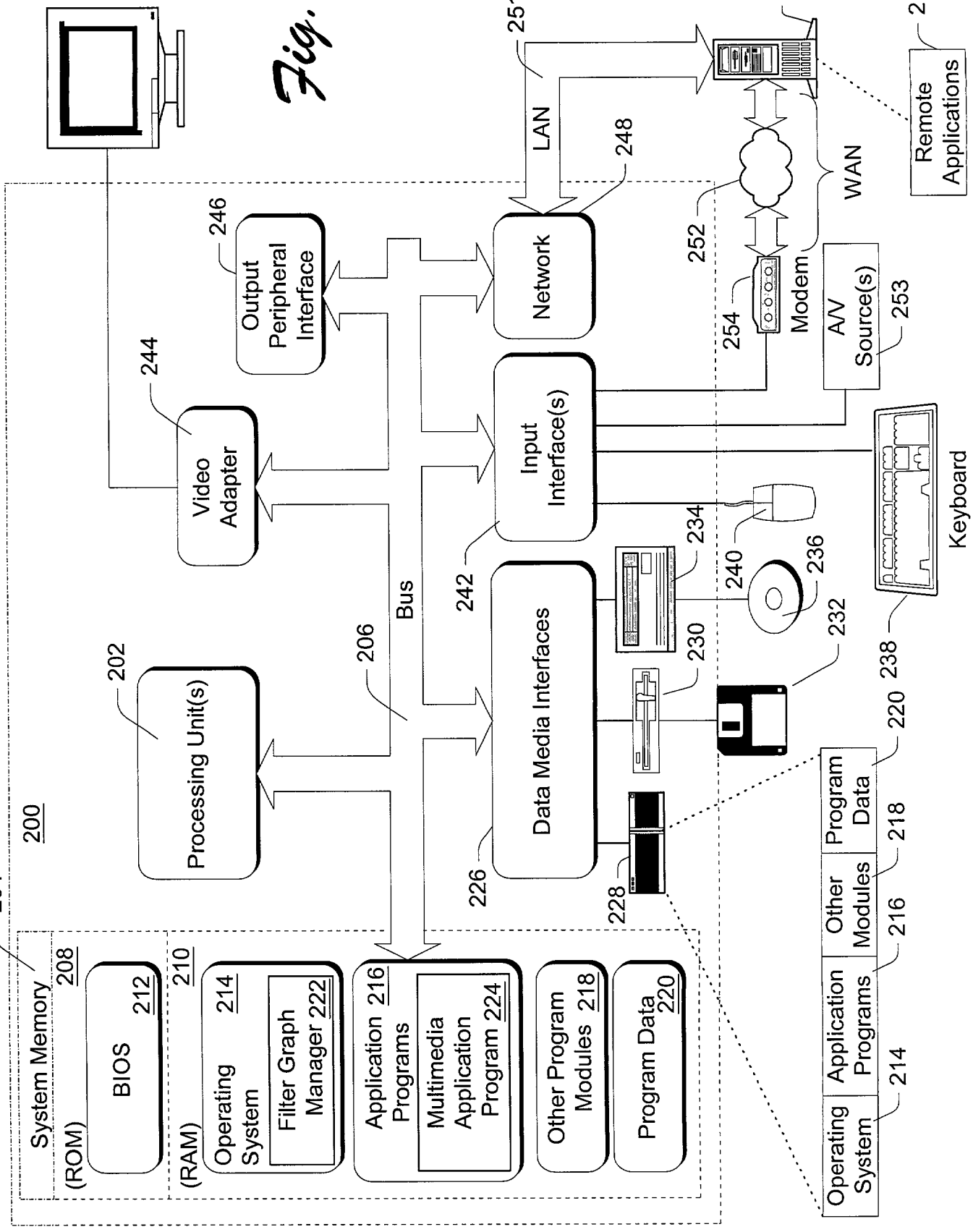
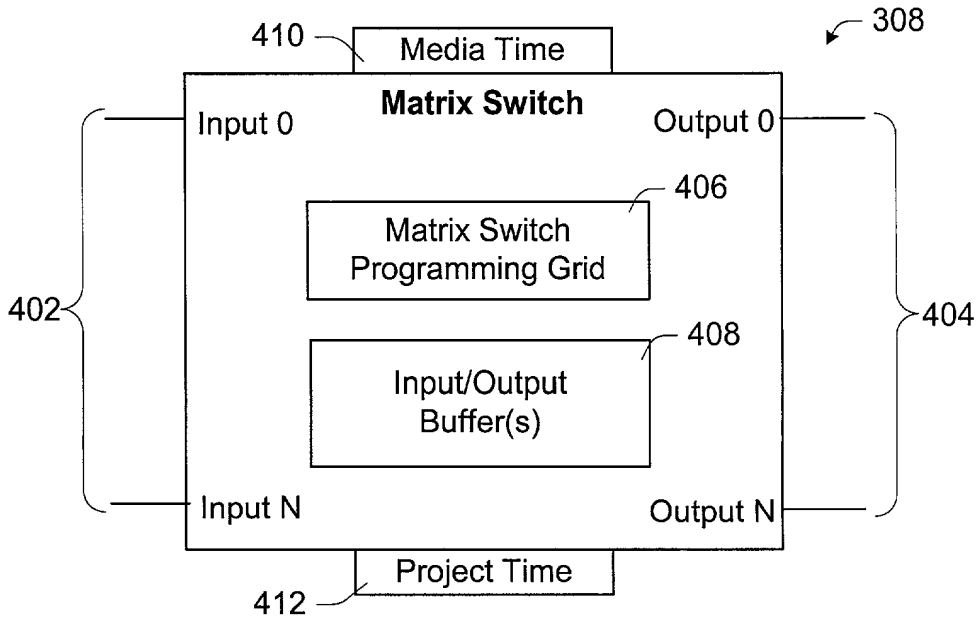

200
204
System Memory
208
(ROM)
BIOS
212
210
(RAM)
Operating System
214
Filter Graph Manager 222
Application Programs
216
Multimedia Application Program 224
Other Program Modules 218
Program Data
220
Processing Unit(s)
202
206
Bus
Video Adapter
244
Output Peripheral Interface
246
Network
248
LAN
251
WAN
252
Modem
254
A/V Source(s)
253
Input Interface(s)
242
Data Media Interfaces
226
228
230
232
234
236
238
240
Keyboard
250
Remote Applications
216
Operating System
214
Application Programs
216
Other Modules
218
Program Data
220

Fig. 2

Fig. 4


410
Media Time
308
Matrix Switch
Input 0
Output 0
406
Matrix Switch
Programming Grid
402
404
408
Input/Output
Buffer(s)
Input N
Output N
Project Time
412

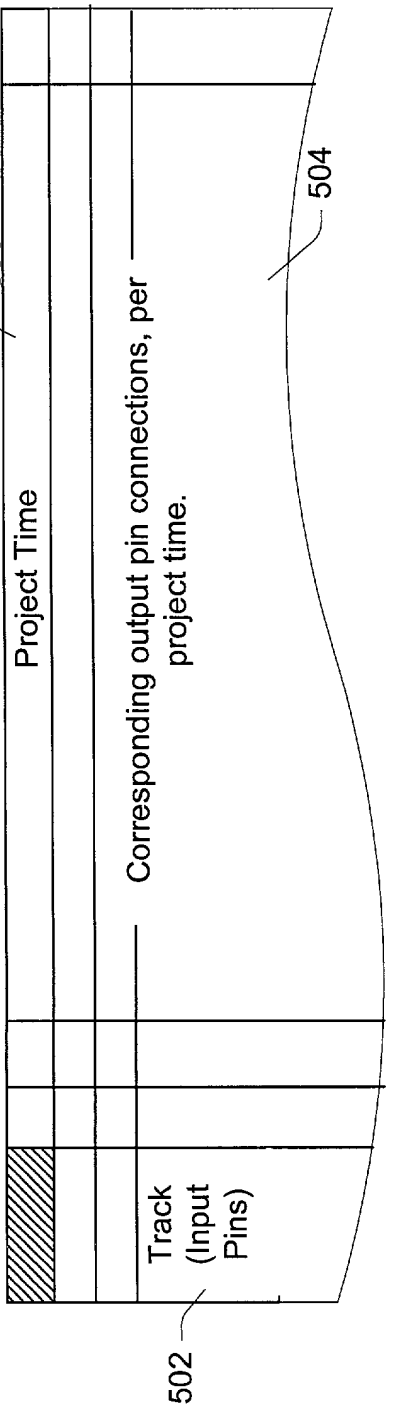

406
Project Time
506
Corresponding output pin connections, per project time.
504
Track (Input Pins)
502

Fig. 5

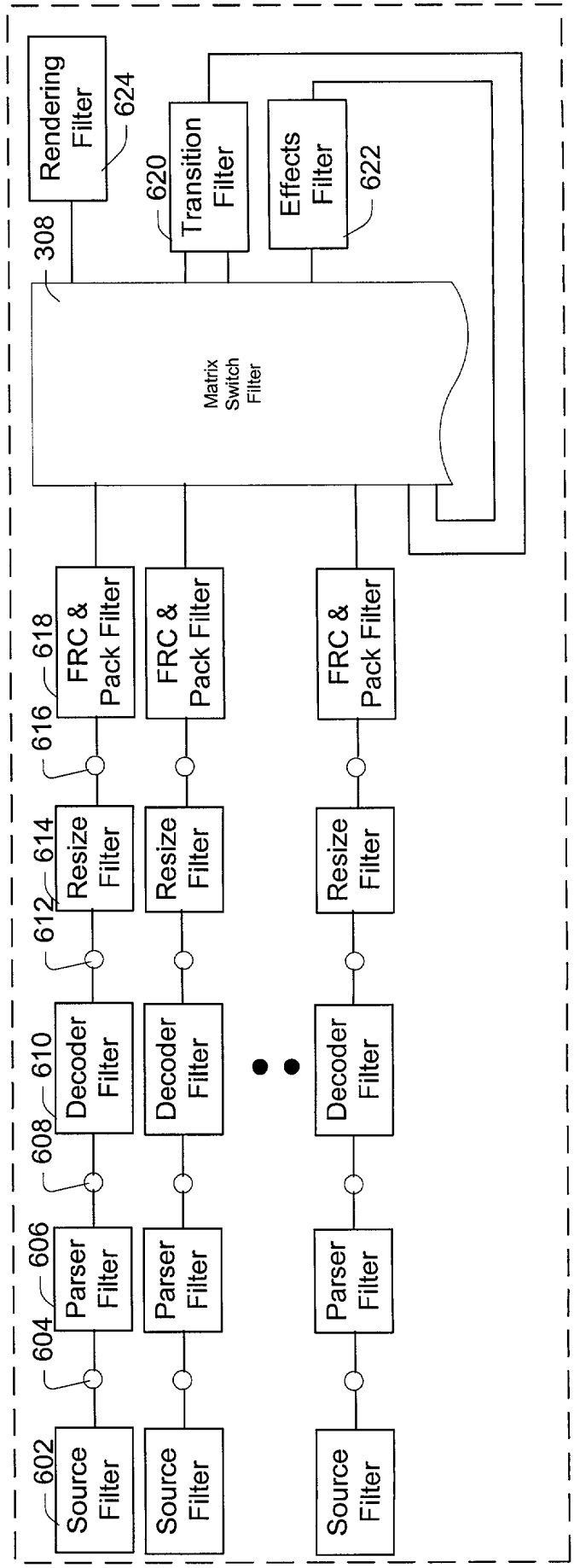

600
Rendering Filter
624
308
620
Transition Filter
Effects Filter
622
Matrix Switch Filter
FRC & Pack Filter
618
616
Resize Filter
614
612
Decoder Filter
610
608
Parser Filter
606
604
Source Filter
602

Fig. 6

Fig. 7

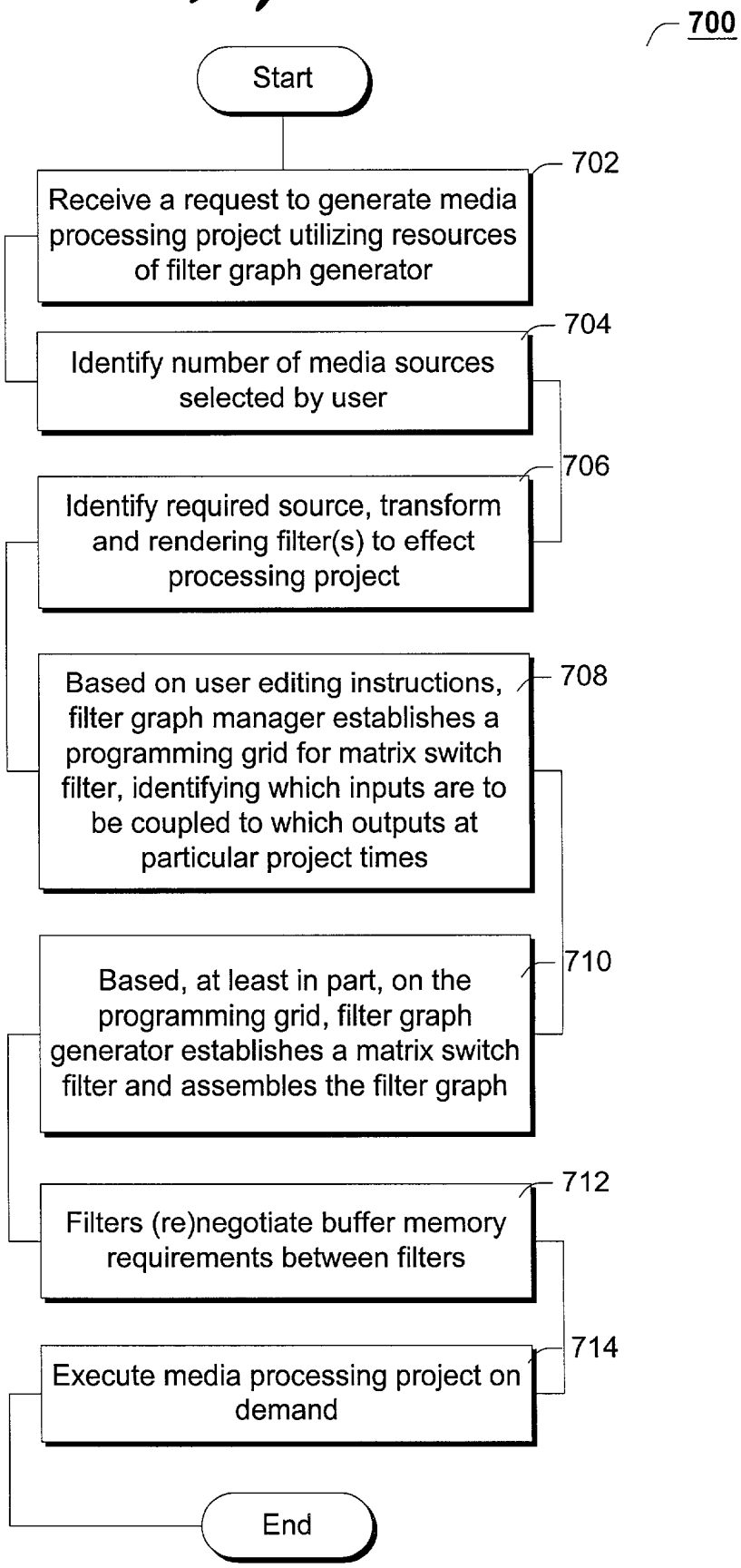
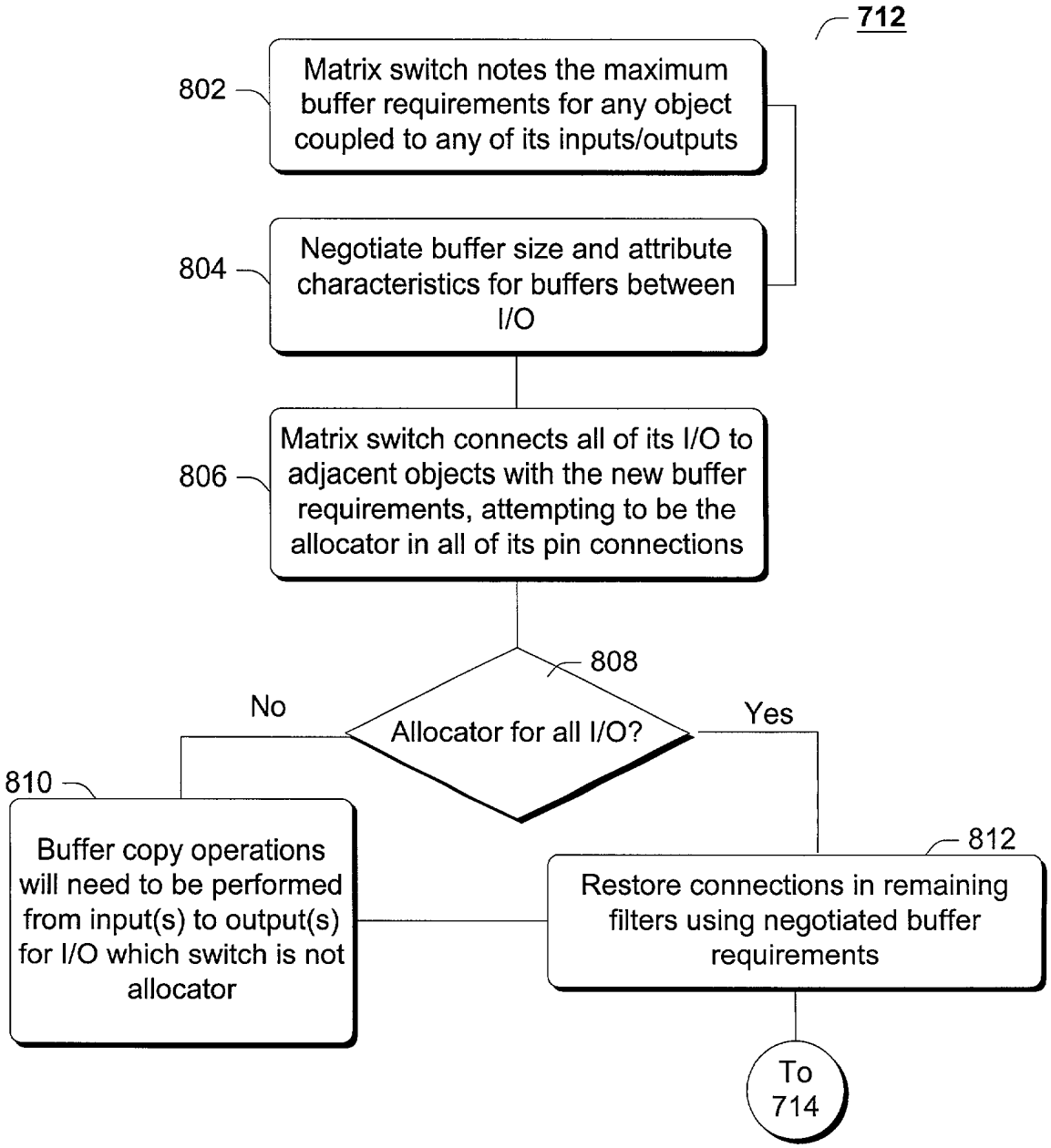

700
Start
Receive a request to generate media processing project utilizing resources of filter graph generator
702
Identify number of media sources selected by user
704
Identify required source, transform and rendering filter(s) to effect processing project
706
Based on user editing instructions, filter graph manager establishes a programming grid for matrix switch filter, identifying which inputs are to be coupled to which outputs at particular project times
708
Based, at least in part, on the programming grid, filter graph generator establishes a matrix switch filter and assembles the filter graph
710
Filters (re)negotiate buffer memory requirements between filters
712
Execute media processing project on demand
714
End

Fig. 8


712
802
Matrix switch notes the maximum buffer requirements for any object coupled to any of its inputs/outputs
804
Negotiate buffer size and attribute characteristics for buffers between I/O
806
Matrix switch connects all of its I/O to adjacent objects with the new buffer requirements, attempting to be the allocator in all of its pin connections
808
Allocator for all I/O?
No
Yes
810
Buffer copy operations will need to be performed from input(s) to output(s) for I/O which switch is not allocator
812
Restore connections in remaining filters using negotiated buffer requirements
To 714

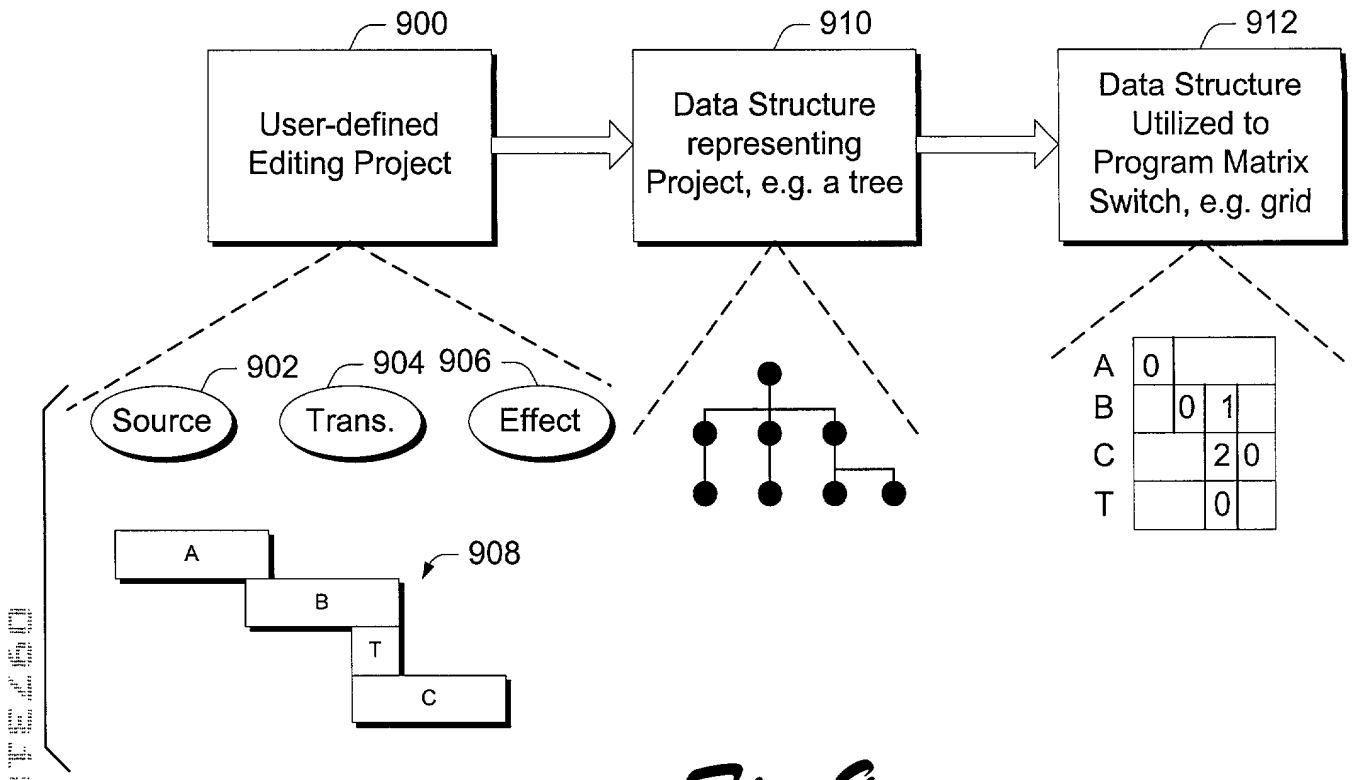

900
User-defined Editing Project
910
Data Structure representing Project, e.g. a tree
912
Data Structure Utilized to Program Matrix Switch, e.g. grid
902
904
906
Source
Trans.
Effect
A
B
T
C
908
A 0
B 0 1
C 2 0
T 0

Fig. 9

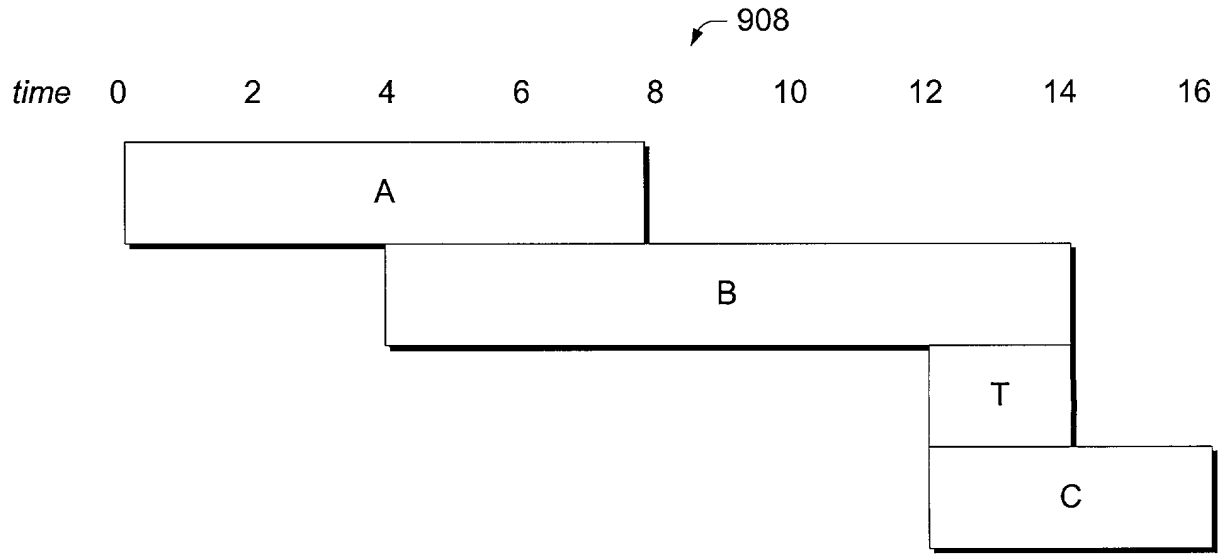

908
time 0 2 4 6 8 10 12 14 16
A
B
T
C

Fig. 10

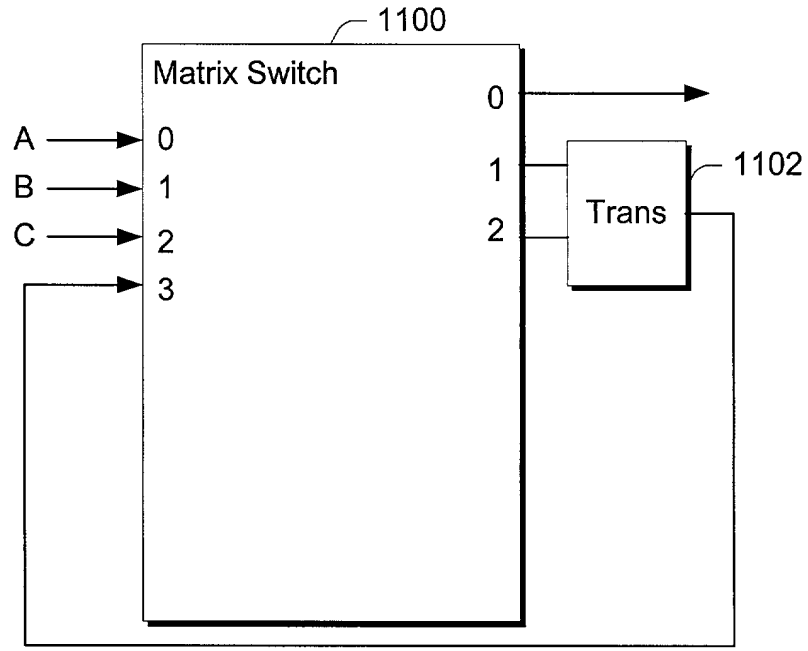


Fig. 11

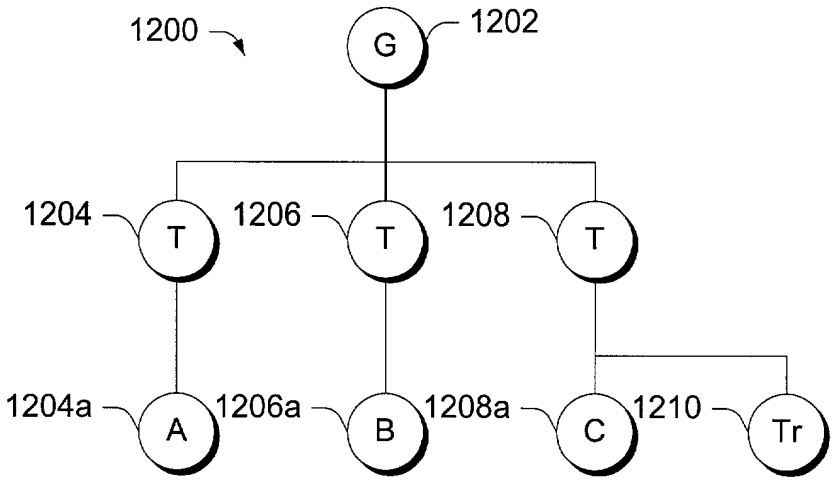


Fig. 12

Doc. 6 Page 6 of 6 Pages

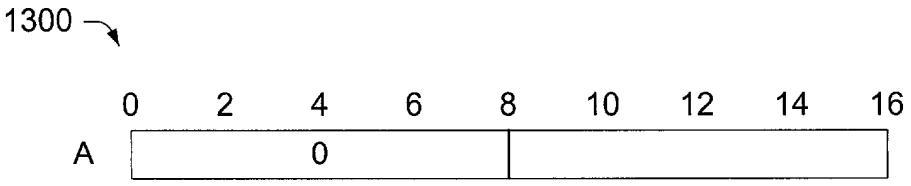


Fig. 13

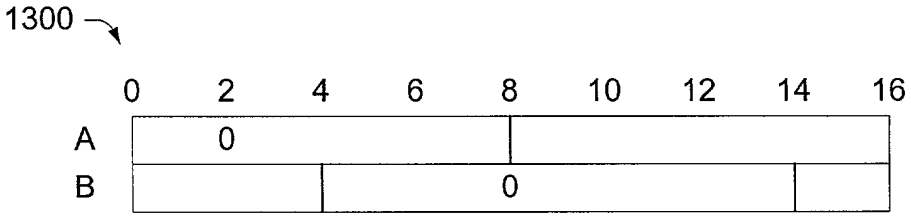


Fig. 14

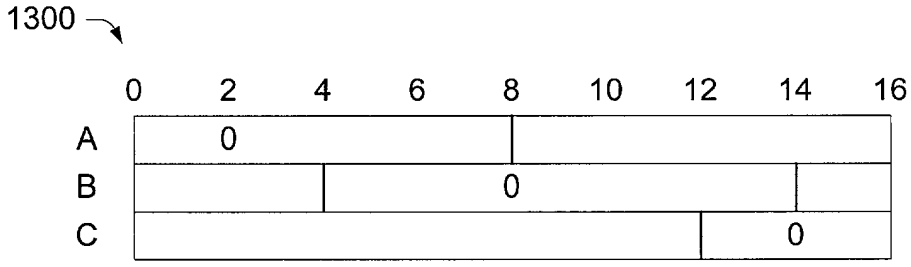


Fig. 15

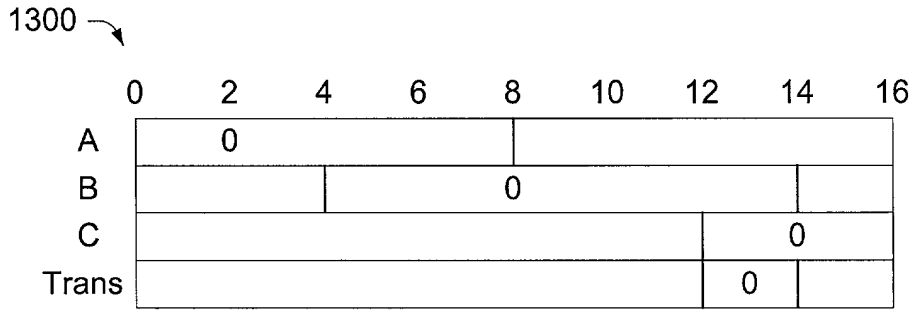


Fig. 16

Docket No. 1600.0

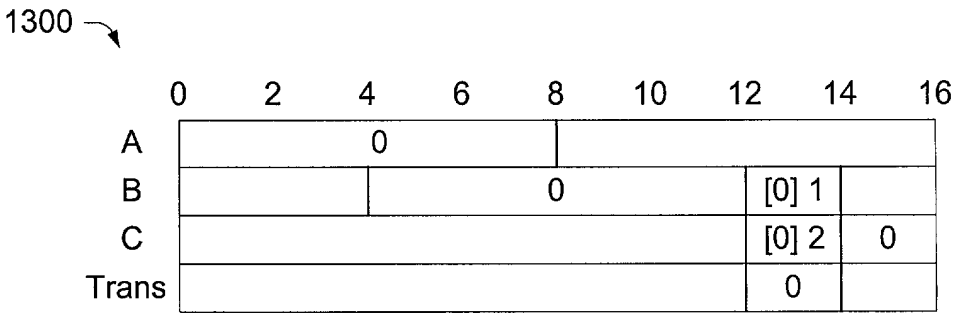


Fig. 17

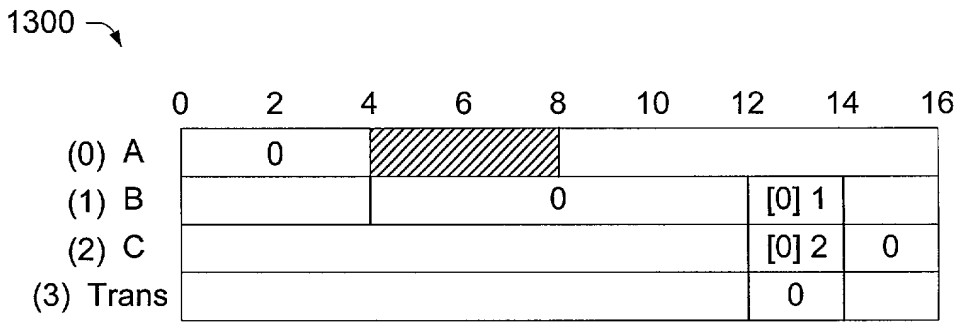


Fig. 18

Doc. No. 1000000

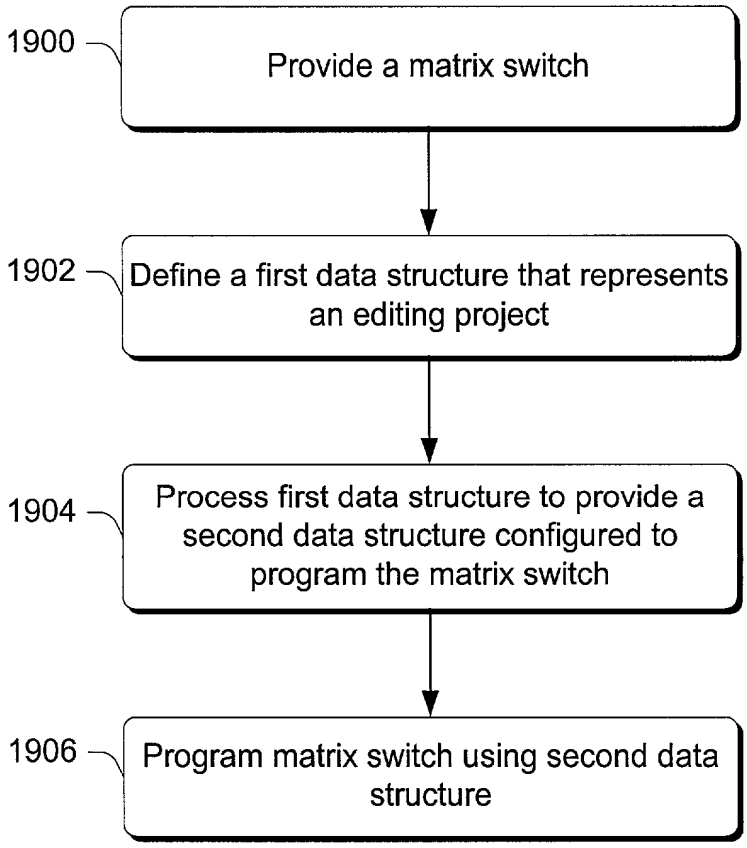


Fig. 19

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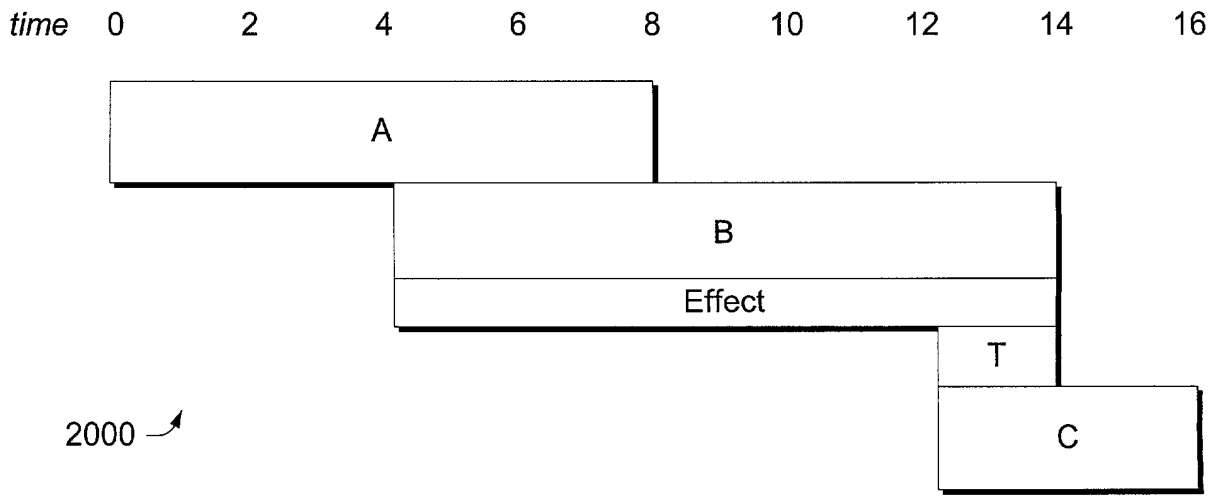


Fig. 20

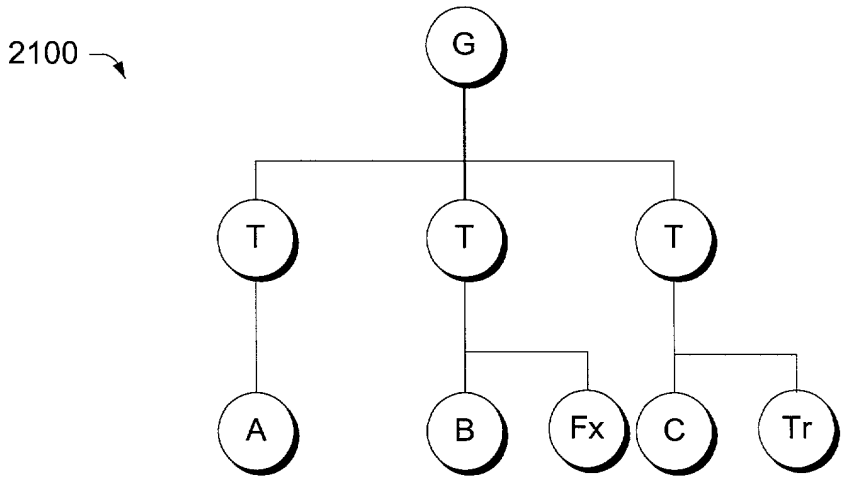


Fig. 21

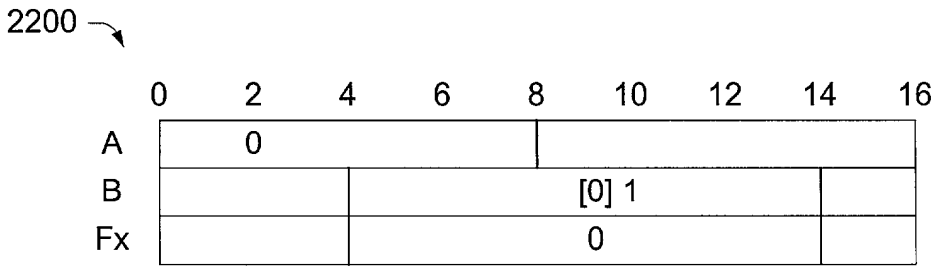


Fig. 22

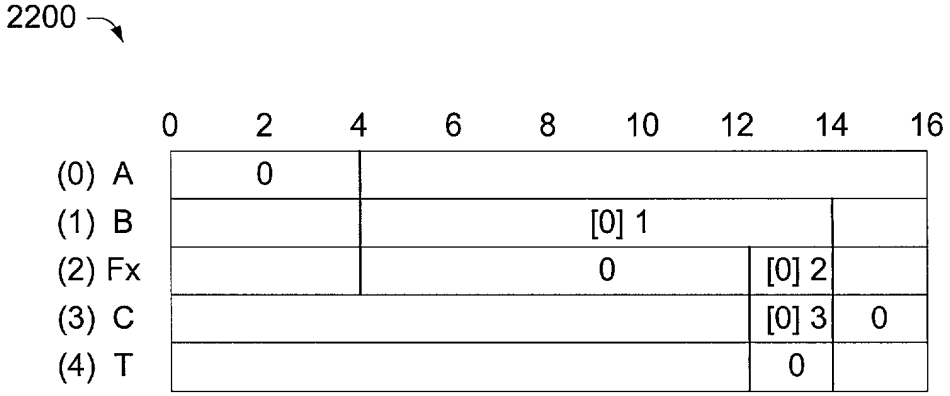


Fig. 23

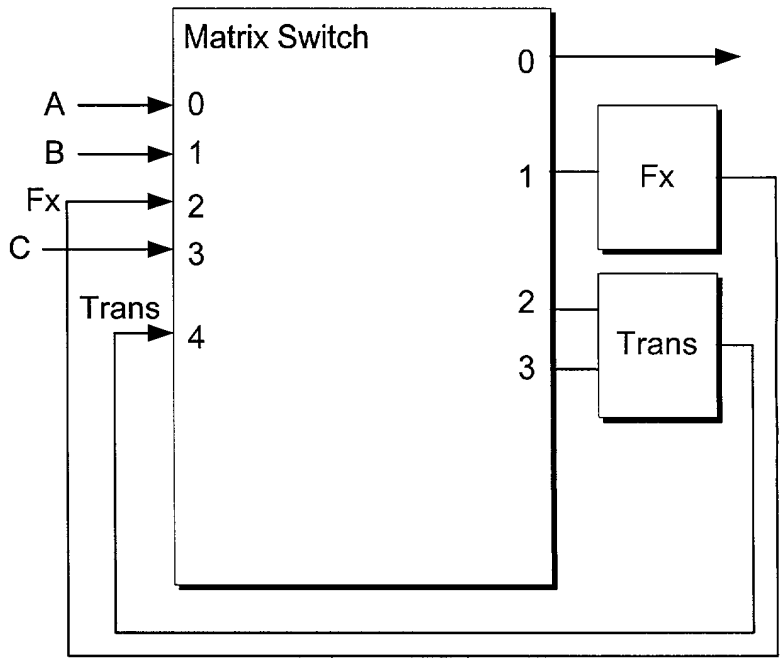


Fig. 24

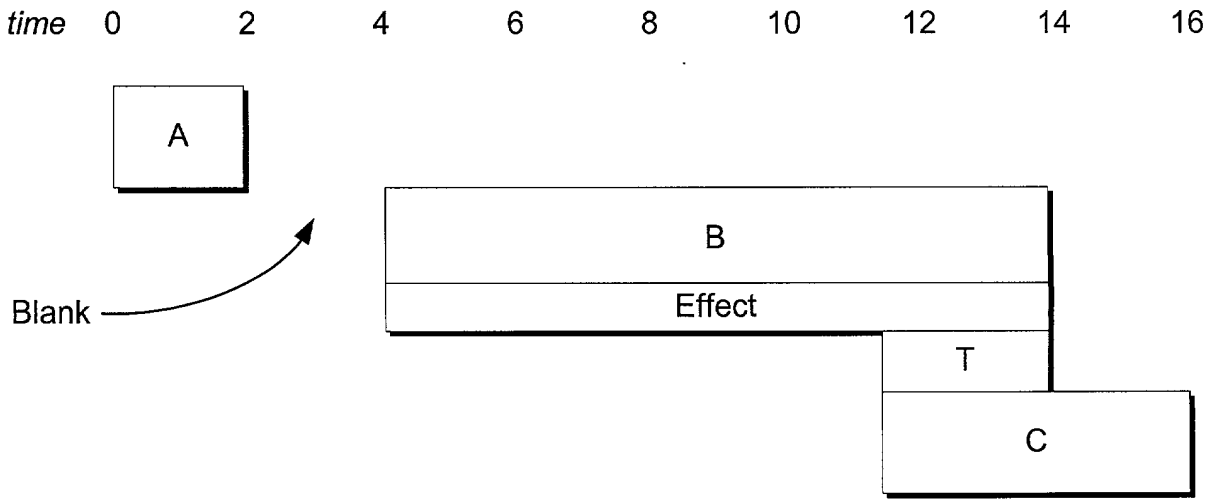


Fig. 25

Docket No. 1-638

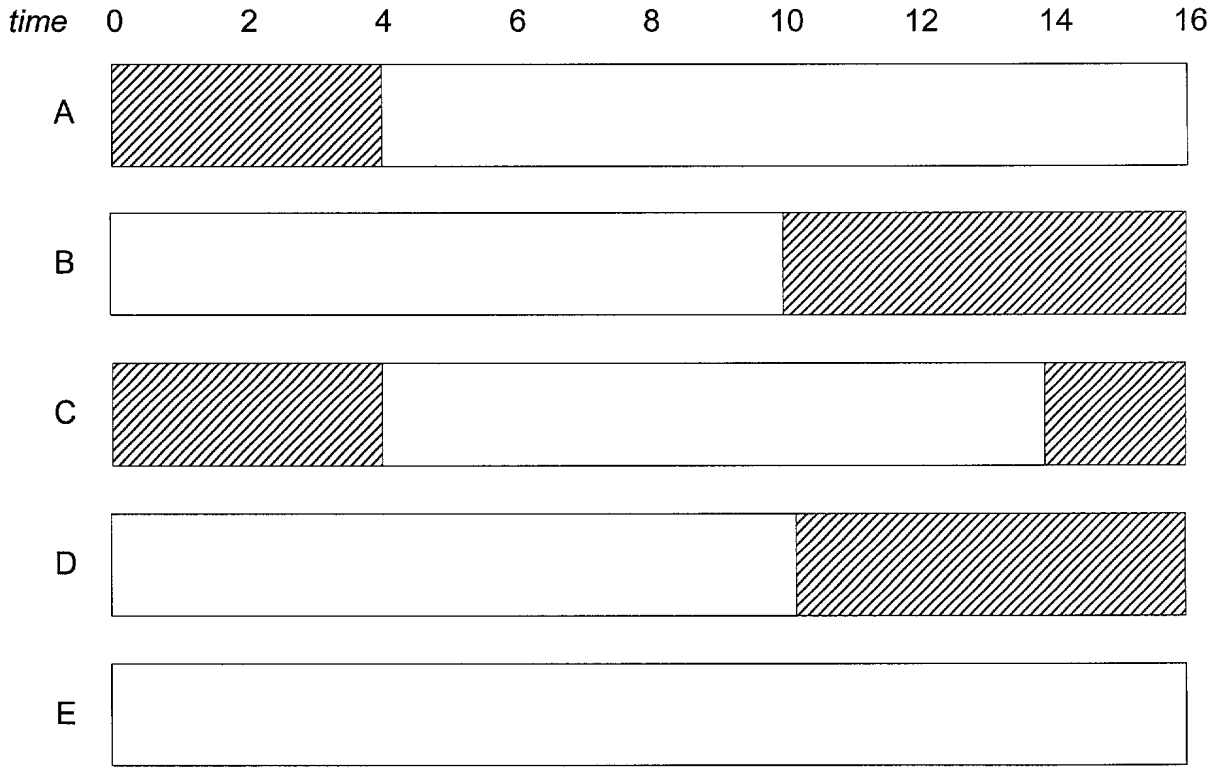


Fig. 26

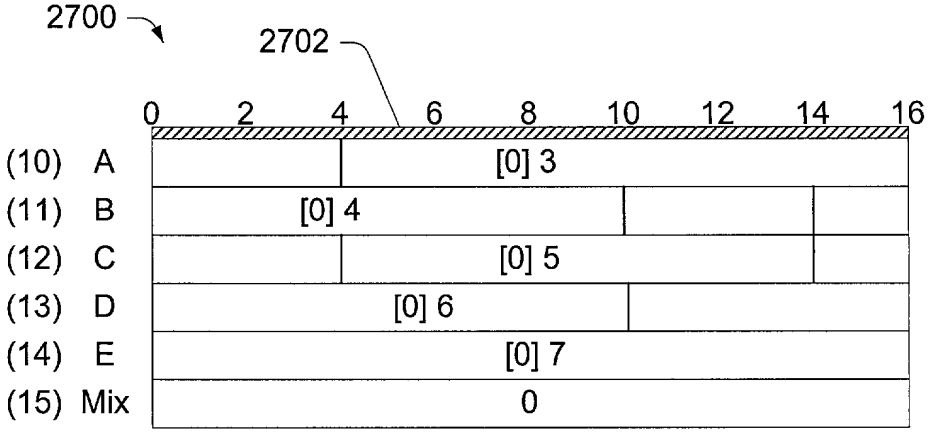

2700
2702
0 2 4 6 8 10 12 14 16
(10) A
(11) B
(12) C
(13) D
(14) E
(15) Mix
[0] 3
[0] 4
[0] 5
[0] 6
[0] 7
0

Fig. 27

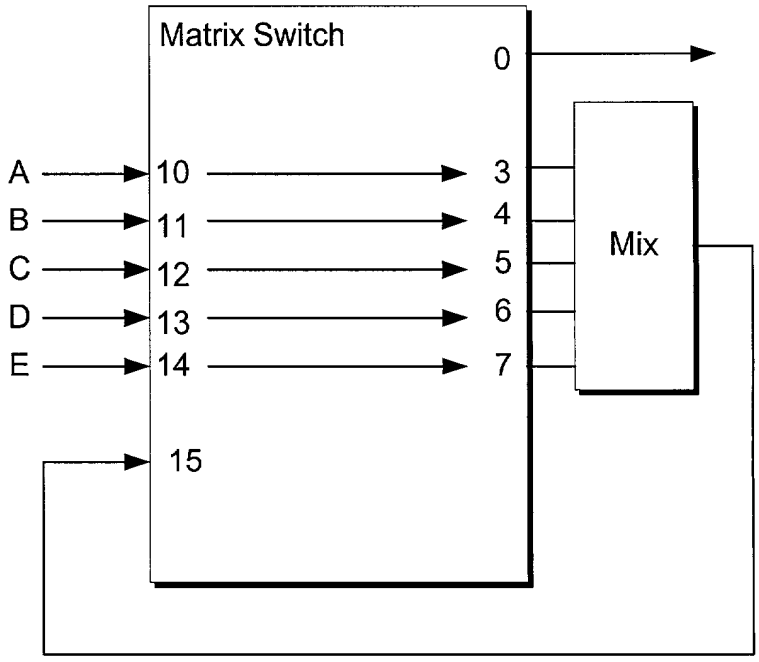

Matrix Switch
A
B
C
D
E
10
11
12
13
14
15
0
3
4
5
6
7
Mix

Fig. 28

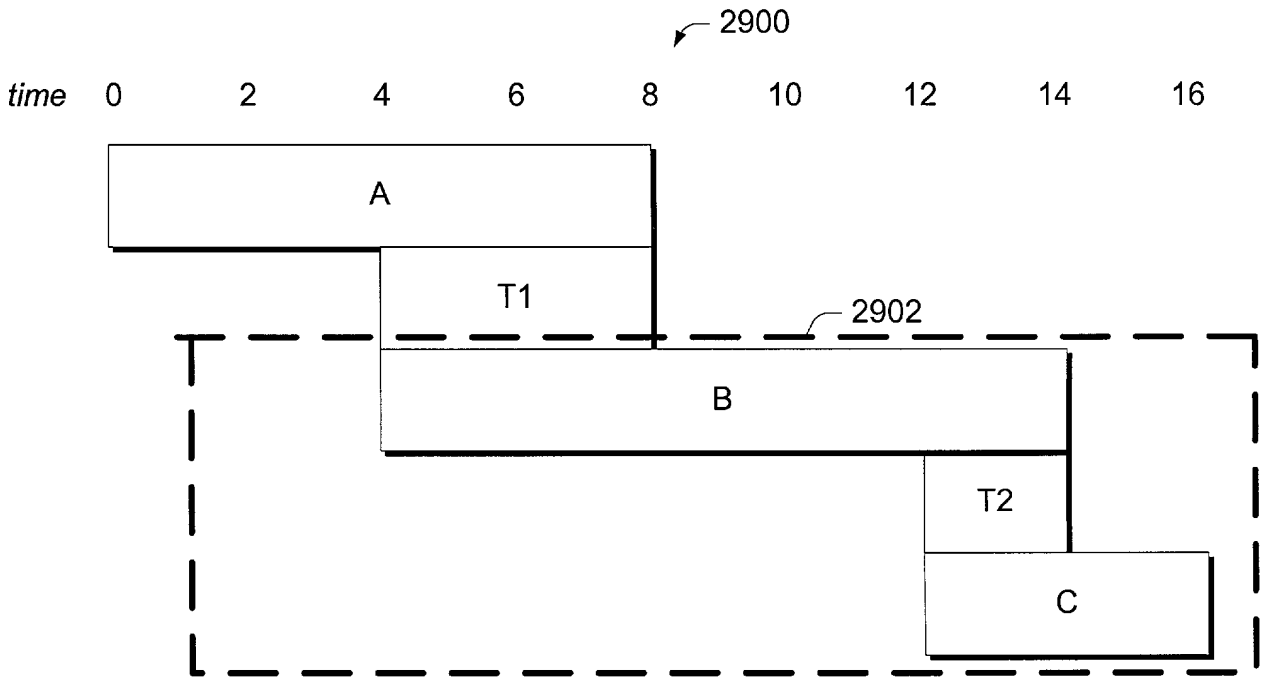

2900
time
0
2
4
6
8
10
12
14
16
A
T1
2902
B
T2
C

Fig. 29

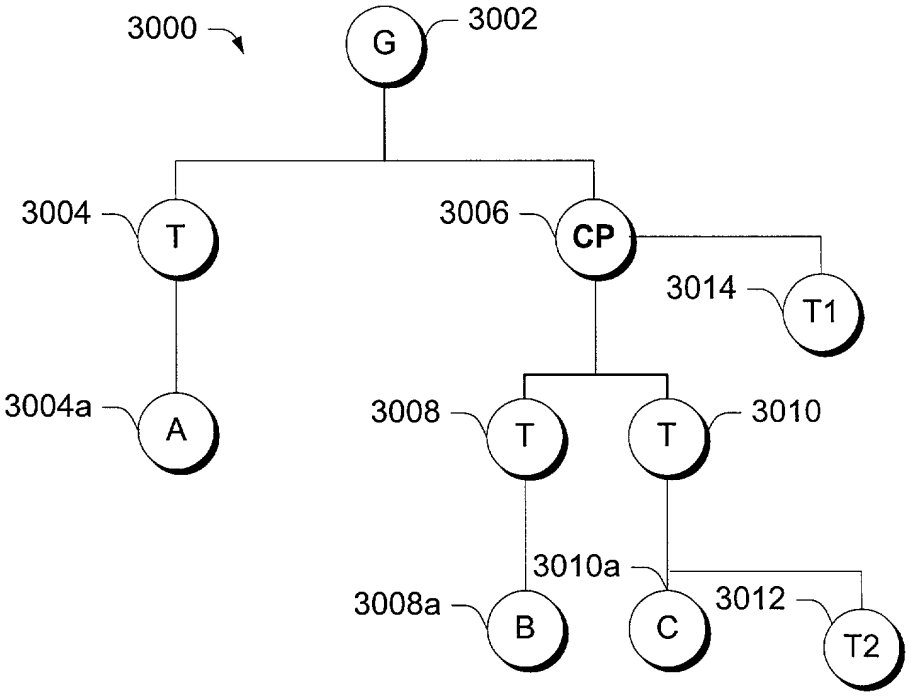

3000
G
3002
3004
T
3006
CP
3014
T1
3004a
A
3008
T
T
3010
3010a
3008a
B
C
3012
T2

Fig. 30

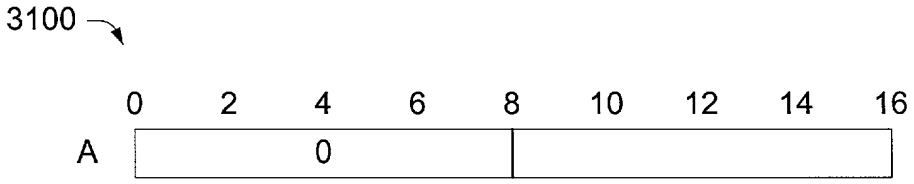


Fig. 31

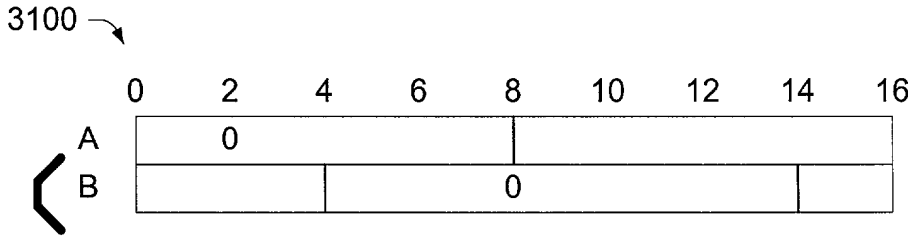


Fig. 32

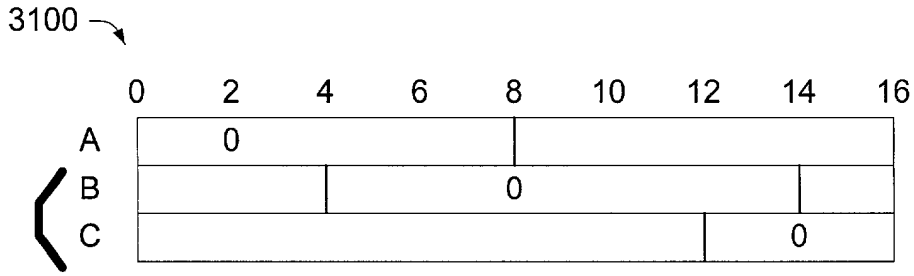


Fig. 33

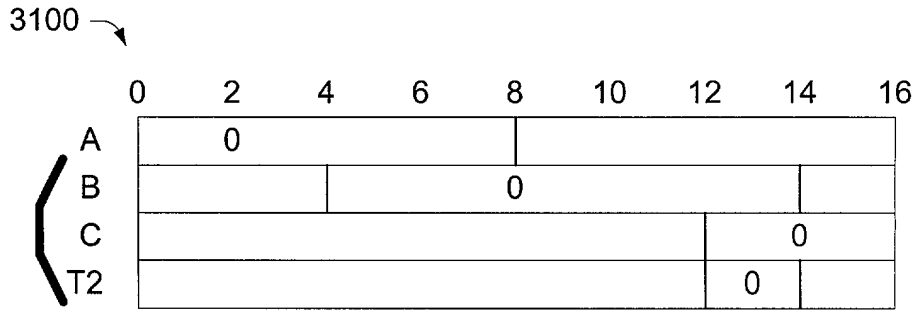


Fig. 34

DS1-638US.ENDOC

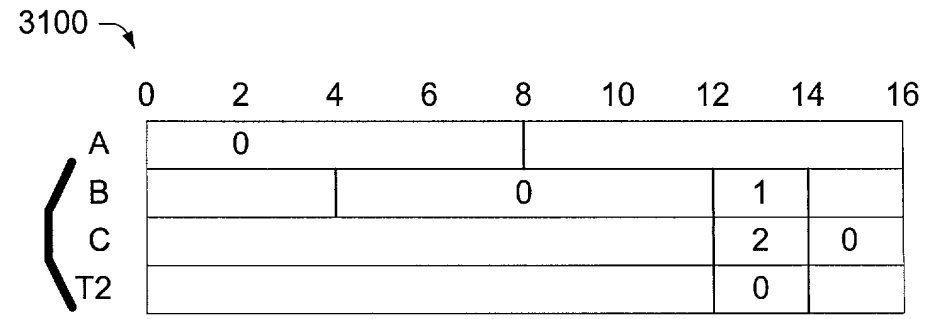


Fig. 35

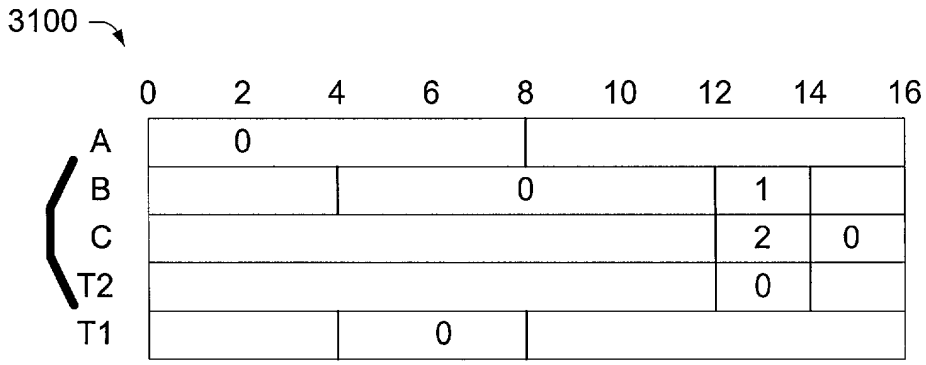


Fig. 36

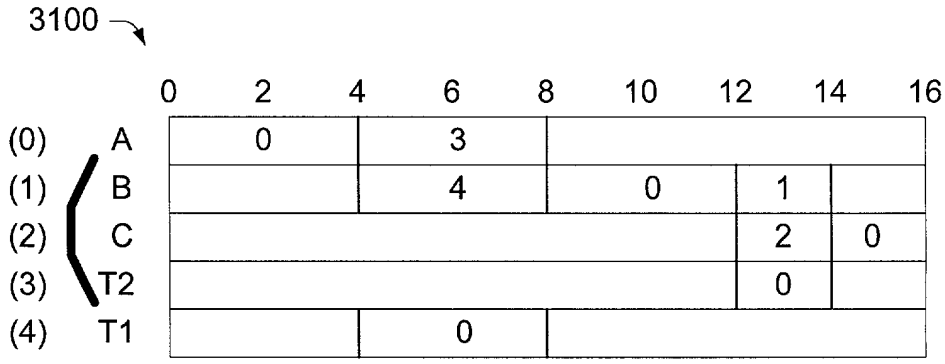


Fig. 37

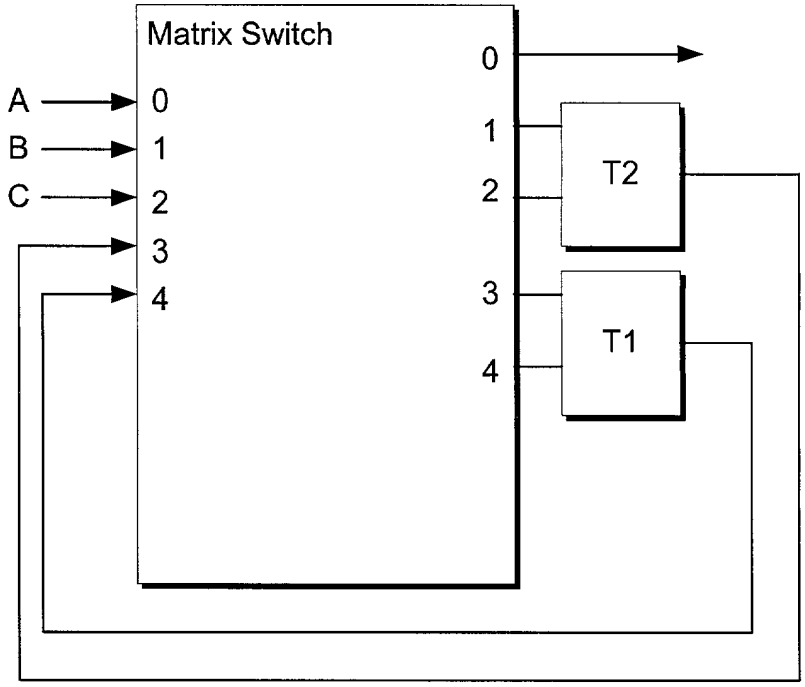


Fig. 38

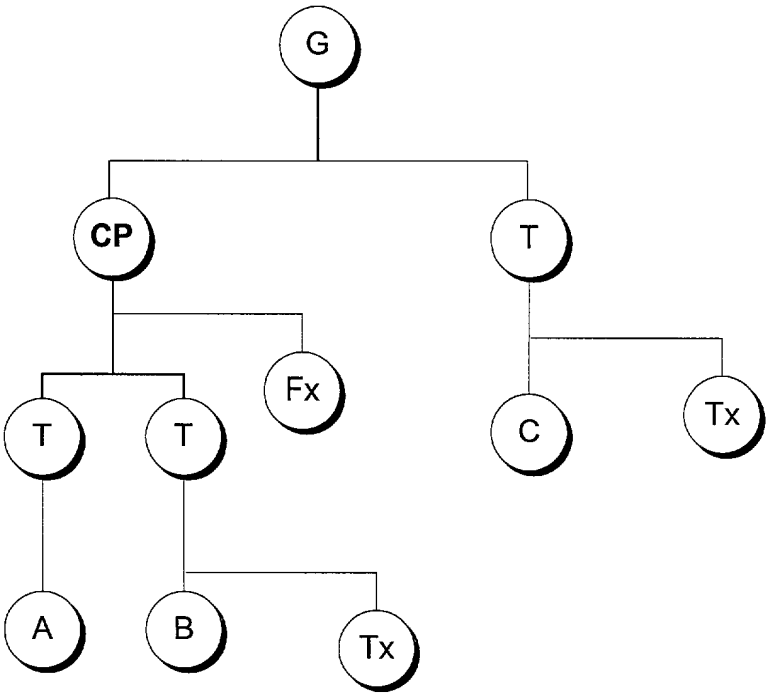


Fig. 38a

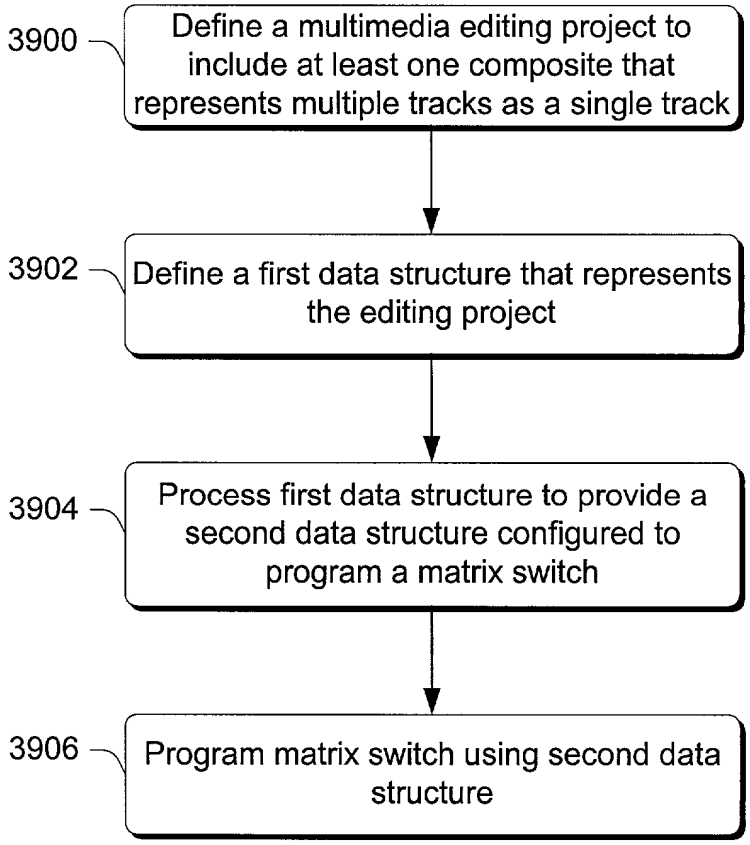


Fig. 39

Exhibit 1008, page 1008

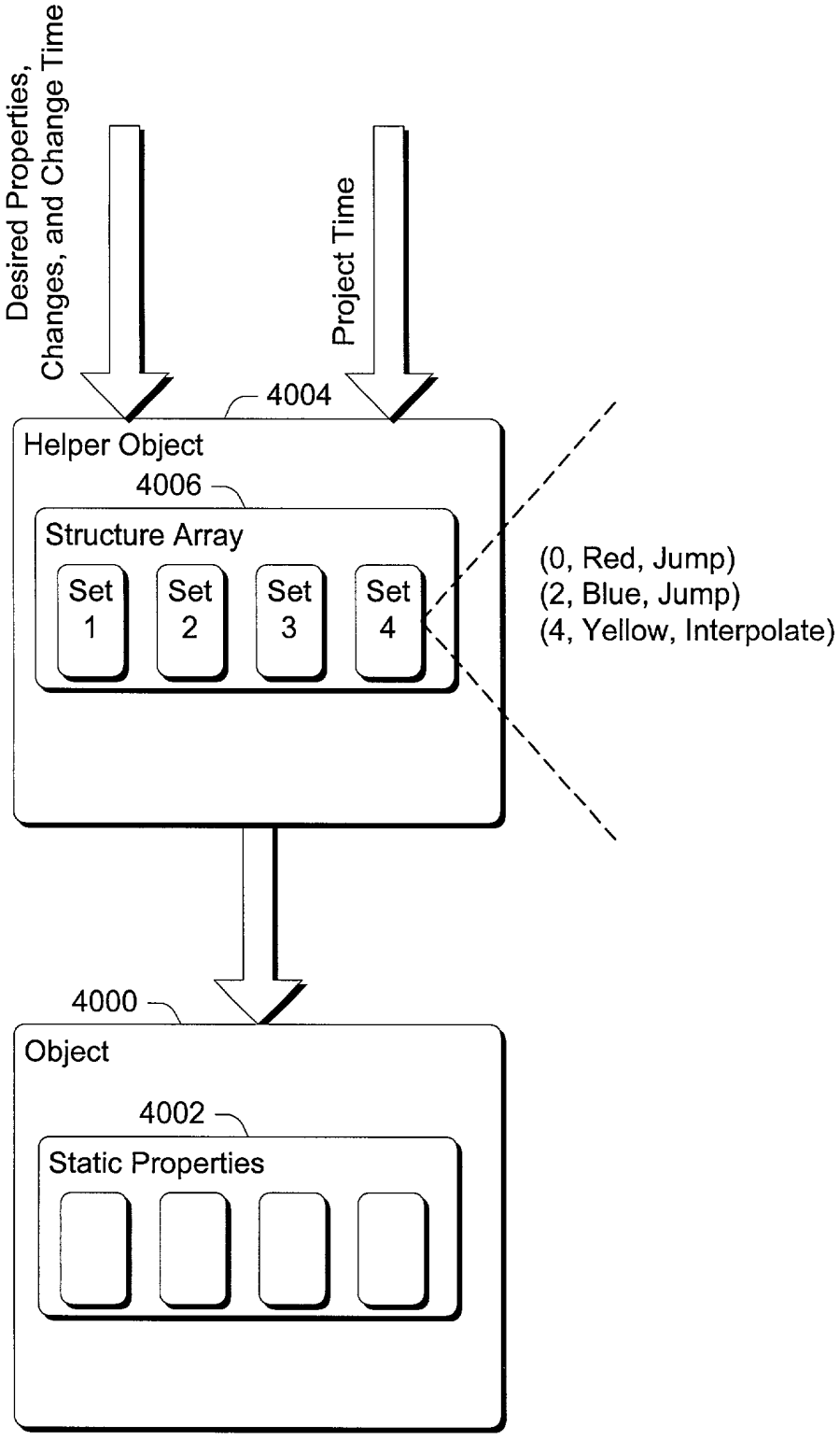
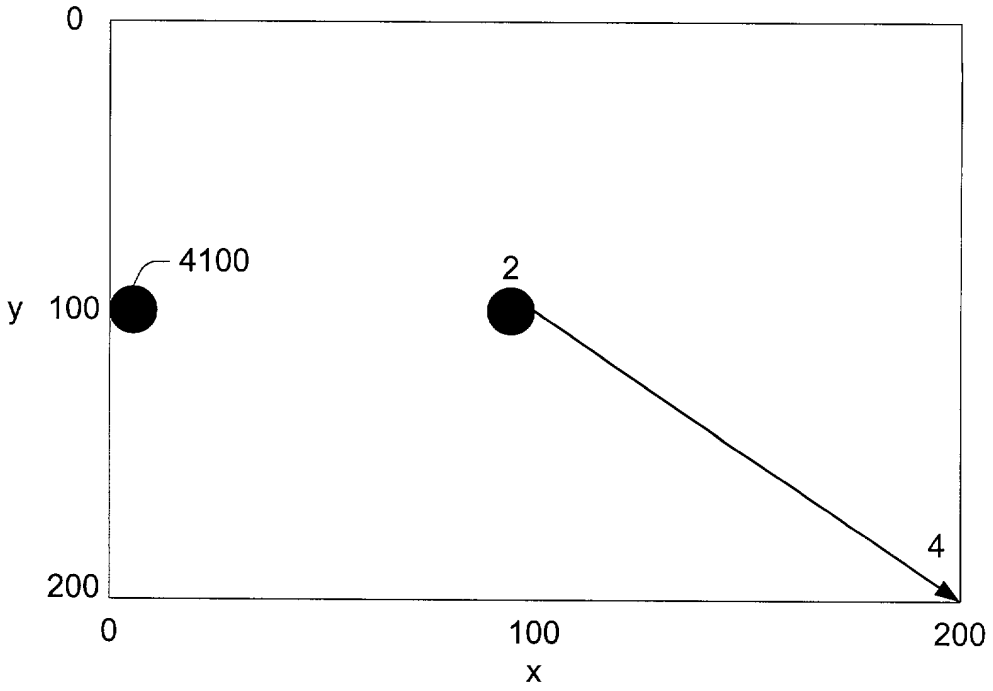

Desired Properties, Changes, and Change Time
Project Time
4004
Helper Object
4006
Structure Array
Set 1
Set 2
Set 3
Set 4
(0, Red, Jump)
(2, Blue, Jump)
(4, Yellow, Interpolate)
4000
Object
4002
Static Properties

Fig. 40



4102

x-direction

(0, 0, jump)
(2, 100, jump)
(4, 200, interpolate)

y - direction

(0, 100, jump)
(2, 100, jump)
(4, 200, interpolate)

Fig. 41

Client's Docket No. 320501.01

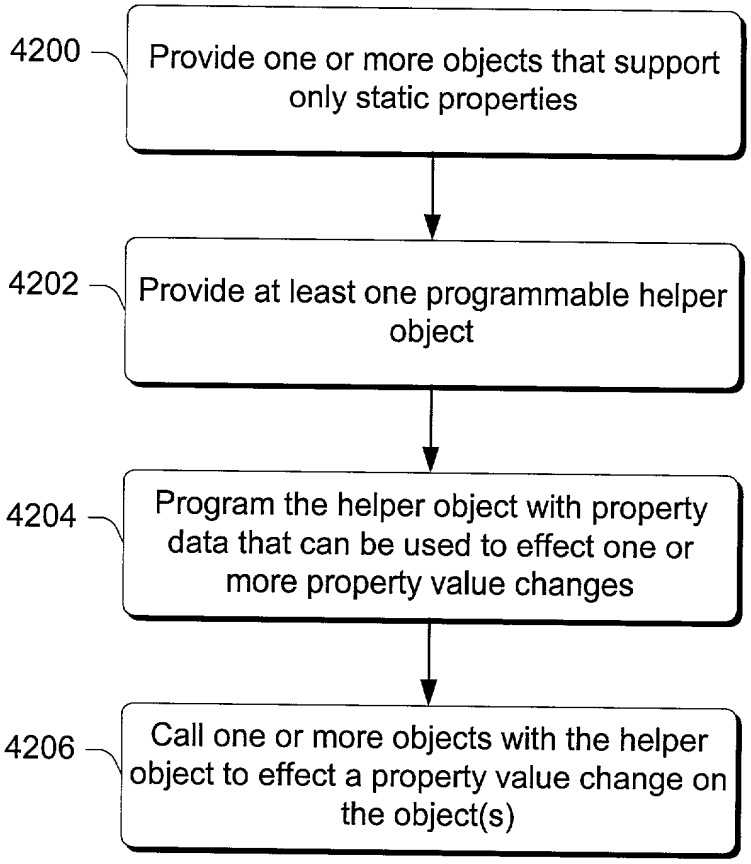


Fig. 42

Microsoft Exhibit 1002

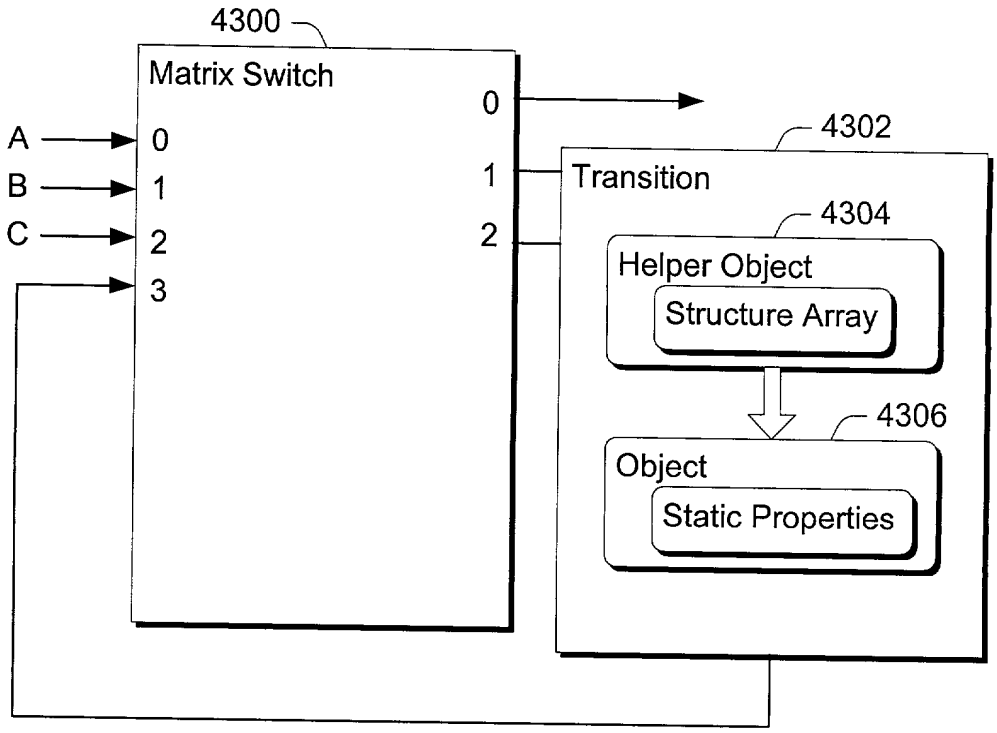

4300
Matrix Switch
A
B
C
0
1
2
3
0
1
2
4302
Transition
4304
Helper Object
Structure Array
4306
Object
Static Properties

Fig. 43